

## Notes on Collembola from wrack.

By

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### 1. *Friesea mirabilis* TULLB.

The number and shape of the anal spines of *poduromorphan* *Collembola* are usually specific for the species, even if they vary to some extent. For instance the genus *Hypogastrura* Börner usually has 2 anal spines, but there are many exceptions of which the names var. *inermis* (without spines) and var. *trispina* (with 3 anal spines) may be mentioned. Probably forms with 2 anal spines are primitive for the whole group, whereas the genus *Friesea* Dalla Torre represents a more specialized type with 3 as the primary number of anal spines. The genus *Polyacanthella* Schöff. — which Gisin 1944 considers as a subgenus to *Friesea* — is characterized by 4—7 anal spines.

In seaweed, thrown up on the shore of Aspö in Blekinge, examined 23. VIII. 1940, I found 3 specimens of a *Collembol* which had 5 anal spines quite as *Polyacanthella quinquespinosa* Wahlgren (Fig. 1 a). In all other characteristics, for instance the number of ommata, my specimens were identical with *Friesea mirabilis* Tullb. so that there is no question about their belonging to this species. Yet it is remarkable that I could not find any normal *Friesea mirabilis* specimens in this material which consisted of 1750 *Collembola*.

A 4 litre sample from wrack in Barsebäck in Skåne (4. VII. 1942) comprised 12.000 *Collembola*, less than 1 % of which were *Friesea mirabilis*. A great part of these showed abnormalities, one

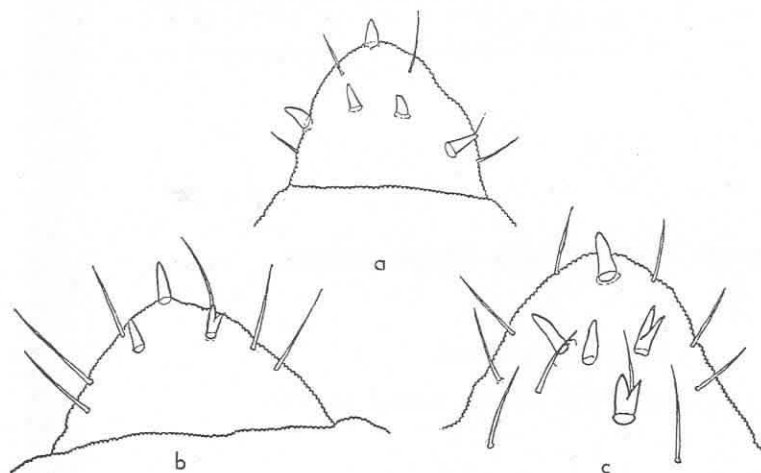


Fig. 1. Abdomen end of *Friesea mirabilis*: a with 5 anal spines, b and c with forked anal spines.

or two anal spines were forked (Fig. 1 b and c). At the same time the number of anal spines was often multiplied, but the spines never stood in regular rows as those of *Polyacanthella* or the above described aberration. Monstrosities are not unusual among *Collembola* but I would not like to describe these aberrations as monstrosities. They have some interest because they show a tendency to changes in a characteristic which formerly was used to separate genera. The specific biotop has not caused such aberrations in any of the other 18 wrack samples with *Friesea mirabilis* which I have taken in various parts of Sweden and Finland. As similar changes occur in whole populations there is probably some lability in the genetic disposition for the number and shape of the anal spines of the genus *Friesea*. *Polyacanthella* has no generic value; the determining characteristic of the genus *Friesea* would seem to be the number of the ommata and the shape of the furca rather than the number of anal spines.

The anal spines of the genus *Friesea* Dalla Torre are said to be inserted on special papillae, whilst those of *Polyacanthella* Schöff. have no basal papillae. This characterization seems to me very questionable; the basal papillae of *Friesea mirabilis* are always very small and often not more visible than those of *Poly-*

*canthella quinquespinosa*. (*P. q.* according to Hammer-Jørgensens collections from Angmassalik, placed at my disposal by doc. I. Agrell).

## 2. *Isotoma propinqua* AXELS.

According to AGRELL 1936 *Isotoma propinqua* var. *pectinata* (Stach) is a variety of *Isotoma propinqua* Axels. with 4 anal spines on papillae on the fifth abdominal segment; in all other respects it is identic with *Isotoma propinqua* f. p. Stach has found this

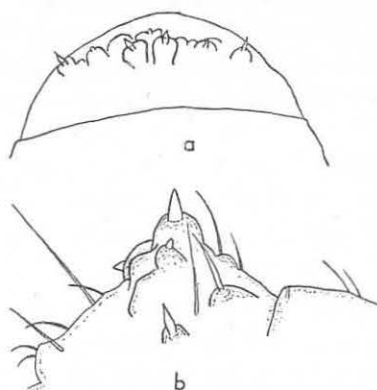


Fig. 2. Abdomen end of *Isotoma propinqua* var. *pectinata*: a schematic dorsal view, b side view of same specimen.

variety in several places in Poland, Agrell in Skåne and Lappland (Sweden). AGRELL l. c. describes also *Isotoma propinqua* var. *hexaspina* which differs from the former variety only in having 6 anal spines instead of 4. The variety is described from Vorsö, Denmark, then was found also in Switzerland (GISIN 1943).

Amongst 6325 collembola from wrack on Femören near Oxelösund (Sweden) there were 5 specimens of *Isotoma propinqua*. 3 of these belonged to *forma principalis*, while 2 were more or less similar to var. *hexaspina*. Yet they showed remarkable differences from this variety. AGRELL's specimen has six typical spines in one row. My specimens have seven typical spines in three indistinct rows (Fig. 2 a): in the first row two big median spines, then two smaller lateral spines and one median spine in the last row. The first two rows are directed upwards, the last spine backwards. In connection with the hindermost median spine there is a row of

papillae without spines, but in other respects similar to the basal papillae of the spines. Furthermore in the spinal zone there are several papillae with pointed bristles of varying size. Contrary to the usual bristles these have a plainly visible base within the thickened cuticle of the papillae. There are also intermediary forms between bristles and spines (Fig. 2 b). Each specimen differs somewhat from the other.

Probably some forms of *Isotoma propinqua* have a tendency to develop papillous thickenings on the dorsal part of the fifth abdominal segment. If such a papilla develops where normally a bristle would stand, this bristle will be more or less spinelike. The number of abdominal spines is not determined; therefore I think there is no reason to distinguish more than the one variety *Isotoma propinqua* var. *pectinata* (Stach.).

*Isotoma propinqua* shows also great variation with regard to its coloration. According to LINNANIEMI 1912 it is greyish blue with light, unpigmented spots; according to GISIN 1944 it is greyish blue or reddish violet. AGRELL 1936 gives the proportions of grey and violet specimens of *f. p.* and of var. *pectinata*. In a sample of shore-driven seaweed taken only some  $\frac{1}{2}$  km from the former place at Femören I found 45 *Isotoma propinqua*. Only one of these was grey, 19 were brilliant green, 25 were brilliant pink. I could not find any intermediate colours.

### 3. *Isotoma bipunctata* AXELS.

This species has not hitherto been found in Sweden but its occurrence was expected since it is one of the small, easily overlooked species and since it furthermore can be contaminated with pigmentfree forms of *Isotoma notabilis* (cfr AGRELL 1939). Also it is found in Finland. I have found it in a collection from seaweed from the shore of Svärdsholmen, Runmarö, Upland, 28. VI. 1941 in the deepest, wet layers of the wrack. A 4 litres sample from this locality held a. o.: *Ptenidium fuscicorne* (1 ex.), *Acrotrichis fratercula* (2 ex.), *Lathrobium longulum* (4 ex.), *Cryptobium fracticorne* (1 ex.), *Quedius molochinus* var. *picipennis* (1 ex.), *Otiorrhynchus ovatus* (1 ex.), *Sciaridae* sp., *Harpacticidae* sp. and 3550 *Collembola* of which *Onychiurus armatus* < 1%, *Folsomia sexoculata* 1—10%, *F. fimetaria* < 1%, *Isotoma bipunctata* 1—10% and *I. olivacea* var. *grisescens* 80—90%.

#### 4. *Isotoma olivacea* var. *tigrina* (Nic.).

AGRELL 1936 compares *Isotoma olivacea* Tullb. with *I. violacea* Tullb. and finds that they belong to the same species because there are all the intermediates between them. The species must bear the older name, *Isotoma olivacea* Tullb. The following varieties form continual series: var. *grisea* (Schäff.), *forma principalis*, var. *intermedia* Agrell, var. *violacea* (Tullb.), var. *mucronata* Axels. Thus AGRELL has brought order in a problem that hitherto was very difficult to everybody who worked with the ecology of North European *Collembola*. Unfortunately GISIN 1944 has again taken up the species *I. olivacea* and *I. violacea*. Furthermore GISIN takes up a species *I. tigrina* (Nic.) which he placed nearest to *I. olivacea*. GISIN gives the following differential diagnosis:

»Proximalzähne des Mu. aufrecht, breit. Meist oliv oder gelbbraun. PAO. oval.» — *olivacea* Tullb.

»Proximalzähne des Mu. distalwärts gerichtet, dornartig. Grau. PAO. mit parallelen Rändern.» — *tigrina* (Nic.).

The shape of the postantennal organ and the colour of *I. tigrina* (Nic.) sensu GISIN corresponds exactly with AGRELL's description of *I. olivacea* var. *grisea*. These two forms are identical because we cannot pay any attention to the shape and direction of the proximal teeth of the mucro; these characteristics are very varying even in the same population of all varieties of *Isotoma olivacea*. GISIN says also: »*tigrina* (Nicolet 1841); Denis 1938 c; [= *f. grisea* Schäffer 1896; Linnaniemi 1912; = *grisea* Lubbock 1869]».

The name *Isotoma tigrina* (Nic.) is one of the oldest in the literature about *Collembola*, but it has been very much misused. NICOLET's original diagnosis from 1841 follows: »Pilosa. Segmentum tertium abdominis longius quam quartum. Antennae paullo longiores; articulus tertius brevior quarto, secundo non longior. Denticuli mucronum 3, alius post alium insertus. Long 1 mm.»

TULLBERG's diagnosis 1871 of *Isotoma tigrina* Nic. does not differ from NICOLET's in any principal points: »Parce setosa. Antennae capitae non longiores. Furcula gracillima. Denticuli mucronum 3, alius post alium insertus. Long 1 millim.»

Both diagnoses are so short that we could not with any certainty identify the species. TULLBERG himself says in 1872 that he has identified his specimens with *I. tigrina* Nic. principally on the

coloration. But then the *I. tigrina* Nic. of Tullberg is quite well described by his pupils as a species closely related to *I. olivacea*. There is no reason for criticism if younger authors add new details to an old diagnosis, but in my opinion it is quite incorrect for them to alter a diagnosis on substantial points, giving as a motive that the older author's observations were erroneous. TULLBERG 1872 says that he in some cases has seen a small lobe or a trace of a fourth tooth at the basis of the mucro. Both SCHÖTT 1902 and ÅGREN 1902 alter the diagnosis saying that the mucro of *Isotoma tigrina* has 4

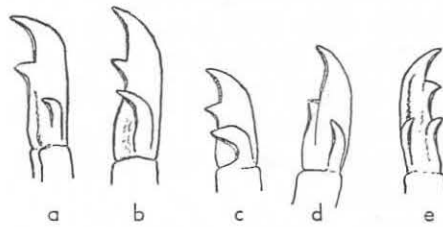


Fig. 3. a—d mucro of *Isotoma olivacea* var. *tigrina*. e mucro of *I. olivacea* var. *grisescens*.

teeth. SCHÖTT and ÅGREN give *I. tigrina* the auctor's name Tullb. The form that they describe is identical with *I. olivacea* var. *grisescens*. LINNANIEMI 1912 has *I. tigrina* only as a synonym for *I. olivacea* var. *grisescens*; he bases his opinion partly on SCHÖTT and ÅGREN, partly on his own collections. He considers specimens of *I. olivacea* with only 3 mucronal teeth as »eine seltene (ob monstruöse?) Form von der stark variationsfähigen *grisescens*».

In my collection of *Collembola* from wrack there are *Isotoma olivacea* whose coloration, hairs and postantennal organs quite agree with *I. olivacea* var. *grisescens*, but my specimens have constantly only three mucronal teeth (Fig. 3). If you study the mucro from profil, it looks as if the three teeth were standing in one line, but if you study it from the ventral side, you see that the antapical tooth is inserted a little bit to one side of the middle line, the proximal tooth a bit to the opposite side. Both location, size, and shape of the teeth is variable.

I suggest that the name *tigrina* according to NICOLET's diagnosis should be reserved for this variety with three mucronal teeth and that its full name should be *Isotoma olivacea* var. *tigrina* (Nic.).

*I. olivacea* var. *tigrina* is undoubtedly closely related to *I. olivacea* var. *grisescens*, but it occurs in such numbers that it must have an own name. I have found it in the following Swedish provinces: Uppland, Södermanland, Småland, Blekinge, Skåne, Västergötland, and Bohuslän. It has the highest constancy and the highest dominance of all *Isotomidae* found in wrack on Swedish shores. In Finland, where I also have investigated the wrack fauna, I have only found it on Eckerö in the westernmost part of Åland. This may be the reason why LINNANIEMI never found this variety.

I have not given so much space to this question merely because I was interested in the priority of the name *tigrina* but also because AGRELL 1936 shows that the varieties of *Isotoma olivacea* have different ecological claims on the environment. It is therefore interesting to see that such a marked variety of *I. olivacea* as *tigrina* is a characteristic inhabitant of wrack and probably occurs more or less exclusively in seaweed.

##### 5. *Lepidocyrtus curvicollis* BOURL.

This species I took on Elgö near Tvärminne in Nyland (Finland) 28. VII. 1937. The find was unexpected because in the neighbouring countries *Lepidocyrtus curvicollis* is found only in the crypt of the cathedral in Lund. According to literature it is not synanthrope in central and south Europe, but lives in the vegetation or in the uppermost soil layers. It always occurs sparsely.

My specimens do not agree completely with those from Lund, but all separating characters may be of juvenal nature: Length 0.9—1.2 mm. Colour: yellow, ocellar plate black pigmented, ant. IV light violet. Scales yellow. Abd. IV = 3.5 × abd. III. Claws and empodial appendix without teeth. Empodial appendix  $\frac{4}{5}$  of claw.

*Lepidocyrtus curvicollis* was found in wrack in Näsvisk on Elgö in wet, but scarcely mouldered *Fucus vesiculosus*, 7—18 cm:s under the surface. The zoocoenosis had the following composition (4 litres sample): *Porcellio scaber* (49 ex.), *Acari spp.* (< 1 000 ex.), *Oedothorax retusa* (2 ex.), *Micryphantidae sp.* (26 ex.), *Pterostichus diligens* (2 ex.), *Cercyon analis* (9 ex.), *Acrotrichis fratercula* (10 ex.), *A. picicornis* (1 ex.), *Lathrobium geminum* (2 ex.), *Cryptobium fracticorne* (2 ex.), *Philonthus velox* (4 ex.), *Quedius umbrinus* (1 ex.), *Atheta halophila* (2 ex.), *A. pygmaea* (1 ex.), *Corti-*

*caria longicornis* (1 ex.), *Sciaridae* sp. *Paramesius rufipes*, insect larvae (30 ex.), *Collembola* (620 ex.), of which *Friesea mirabilis* 70—80%, *Anurida granaria* 1—10%, *Onychiurus armatus* > 1%, *Isotoma viridis* 1—10%, *I. olivacea* var. *grisescens* 1—10%, *I. olivacea* var. *intermedia* 20—30%, *Lepidocyrtus lanuginosus* > 1%, *L. curvicolis* 1—10%. The zoocoenosis is rich in species and individuals, but the greater part of the species is eurytopic. Only *Acrotrichis fratercula* is bound to wrack, *Quediuss umbrinus* and *Atheta halophila* prefer this biotope. Among the *Collembola* there are both surface forms and underground forms.

I would like here to express my gratitude to doc. Ivar Agrell, Lund, who has introduced me to the systematics of *Collembola* and helped me with interesting discussions on these problems.

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